THE OCCURRENCE OF CANCER
AMONG LUNATICS.

BY

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At the present time the question of the nature
of cancer and its relative incidence under vary-
ing conditions is uppermost in medical literature.
The problems requiring solution are at present in
a stage in which even contributions of a negative
nature in specific directions have a value which
does not always attach to such studies.

In this thesis I shall consider the incidence
of cancer among the inmates of two lunatic asylums.

Statements are frequently made to the effect
that cancer is rare or does not occur among lun-
atics, and by inference one might be led to believe
that the two conditions mutually excluded one an-
other.

It was originally my intention to investigate
this question on the basis of the g figures obtain-
able from all the asylums under the control of the
London County Council. The abstraction and tabul-
ation of the data has, however, been a labour far
exceeding my expectation and has occupied so much
time that up till now I have only been able to
overtake the work with reference to two asylums.
The work is all the more difficult to carry out
because the records are not kept with a view to the
future abstraction of the data here given and the
separate records have therefore to be referred to.

For the proper interpretation of the number of

deaths from cancer among the inmates of these asylums it was necessary to obtain:-

(1) The total deaths for males and females.

(2) The total deaths from cancer for males and females.

(3) The ages at death of both sexes.

(4) The total population male and female.

(5) The ages of the population.

(6) The primary site of malignant disease.

Further, the number of post-mortem examinations is in proportion to the total number of deaths was abstracted in order that the amount of error which might arise from malignant disease escaping recognition during life might be estimated.   As is well known, a large proportion of malignant new growths first come under observation in the post-mortem room.   They have caused no diagnostic symptoms during life, and among the inmates of lunatic asylums it was extremely probable that the number of malignant new growths which escaped notice during life would be higher than among more sound individuals who are less liable to misinterpret the indications of illness.   In this connection it is satisfactory to note that the proportion of necropsies to total deaths is so high as to minimise this possible source of error and to permit one to conclude that very few cases of malignant disease would have been detected among the small number of

bodies which were not submitted to post-mortem
scrutiny.

Before stating the results of what must be con-
sidered a preliminary investigation into the incid-
ence of cancer among lunatics, I desire to safe-
guard myself from the possible imputation that I
am drawing far reaching conclusions from insuffic-
ient data.   Mindful of the fact that the number
of statistical observations upon which any deduct-
ions is based should be considerable, and that the
deduction is trustworthy in proportion as the
observations are numerous, at the present juncture
I only desire to utilise the results for the pur-
pose of this thesis and to point out that the res-
ults thus far obtained, indicate that with a further
extension of the investigation reliable data on the
incidence of cancer among lunatics will be obtained.
The data given in this paper appear on superficial
examination to support the contention that cancer is
rarer among lunatics than among the general pop-
ulation.   Cancer is certainly much rarer among
asylum inmates than among the inmates of general
hospitals. In the large London hospitals one case of Cancer occurs in 42 in-patients.

The proper analysis of the figures however,
shows that this first impression is an erroneous
one.   When the data are corrected for the age and
sex distribution of the population, the incidence
of cancer appears to approximate to that in the

Chartham & Cane Hill Asylum.

Year	Total Deaths		Average Age	
	Male	Female	Male	Female
1896	13 5	94	49.43	50.19
1897	14 7	104	49.40	55.43
1898	14 8	109	48.49	53.44
1899	12 5	150	48.81	61.37
1900	197	150	53.80	53.80
1901	148	117	50.36	54.81
1902	165	116	49.70	57.01
Total	10 6 5	8 4 0	50.18	55.49

Year	Total P. M's.		Average Age	
	Male	Female	Male	Female
1896	116	95	50.30	56.92
1897	131	97	49.31	52.80
1898	119	95	48.66	54.65
1899	117	13 5	49.64	57.33
1900	172	138	50.43	53.80
1901	134	107	47.10	52.62
1902	155	14 2	49.57	52.35
Total	944	809	49.34	54.32

Malignant new growths — Cane Hill & Chatham Asylums

Male

	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80	81-85	86-	Total
Tongue						1	1	1					3
Pharynx							1						1
Oesophagus					1			1					2
Stomach						1		1					2
Caecum								1					1
Rectum					1								1
Liver							1	2					3
Pancreas							1						1
Bladder									1				1
Lung				1									1
Brain	2					1			1				4
Total	2			1	2	4	4	5	2				20

Average Age = 59·80

Female

	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80	81-85	86-	Total
Vulva												1	1
Oesophagus							1						1
Stomach		1		1		2	1	1	1			1	8
Small Intestine				1									1
Hep. Flex.							1						1
Sigmoid					1								1
Rectum						1		1					2
Liver											1	1	2
Pancreas						2			1				3
Bladder					1					1			2
Breast				1		2	1		1		1		6
Uterus				1	1								2
Brain								1			1		2
Mesentery			1										1
Total		1	2	4	3	7	4	3	3	1	4	1	33

Average Age = 62·21

general population - although in making this state-
ment I wish to again guard myself from the errors
which may possibly arise from the paucity of the
available data; more especially because in instit-
uting a comparison between a special death rate in
two institutions and among the general population)
the true principle to follow is on the basis of the
aggregate number of cases treated to a termination
i.e. "the patient death-rate".   I purposely refrain
from attempting to base a seemingly accurate
statistic upon the basis at present available and
have therefore not submitted all the figures to
rigid interpretation, but have contented myself with
a more general approximate interpretation.   In
this interprete approximation there is no doubt a
certain amount of error, which, however, is less
than would have obtained had the small number of
data been subjected to the various corrections
essential to scientific statistics.

The total number of deaths from cancer among
the inhabitants of the two asylums was found to be
53 during the years 1896 - 1902.   The age distrib-
ution and the primary site of the new growth is
given on the table opposite for males and females.
No case of cancer occurred between five to thirty
years of age, the reason probably being the relative
absence of patients at these ages.

The highest number of cases occurrs for males
between 66 to 70 years of age, and for females be-

tween 56 to 60 years of age.   It will be observed
however, that the deaths are few and no attempt is
therefore made to institute a comparison of the age
incidence of cancer with that of the ordinary pop-
ulation.

The site of the primary growth presents no very
unusual feature among the males.   The various
regions of the body are fairly uniformly represented.
One would, however, on a priori grounds, have an-
ticipated a larger incidence in the brain.   In
regard to the females it is a matter of interest to
note that out of a total of 33 cases, 19, or more
than half, affect the alimentary canal and the
secretory organs associated with it.   The relative
infrequency of cancer of the female sexual organs
strikes one as unusual.   As is well known, the
maximum incidence of cancer in females affects the
generative organs and the mammae, and that if these
be excluded from statistics, then the organ relative
incidence of cancer approximates that of the male,
where the chief site is the alimentary canal.   It
is curious that among the female inhabitants of
these two asylums, the occurrence of cancer of the
generative organs is so infrequent, and that without
eliminating these organs, the incidence is very like
that among the male patients.

Among the males, 20 deaths from cancer had
occurred in a total of 1065 deaths, and 33 deaths
from cancer had occurred in a total of 840 female

Chartham Asylum.

Year.	Total Admissions		Average Age.	
	Male.	Female.	Male.	Female
1896	80	87	41.21	43.62
1897	85	124	40.08	45.51
1898	167	212	43.60	46.20
1899	121	158	35.70	40.90
1900	108	130	39.30	43.50
1901	215	298	45.30	46.60
1902	115	119	41.09	44.39
Total	891	1128	41.54	44.79

Year	Total Remaining.		Average Age	
	Male	Female	Male	Female
1896	422	478	44.95	47.38
1897	421	523	43.51	50.09
1898	492	633	46.34	50.20
1899	511	649	47.04	50.45
1900	509	619	46.10	47.80
1901	508	515	41.80	46.00
1902	480	529	43.80	49.80
Total	3343	3946	44.82	48.91

deaths.   The total number of male cadavers sub-
mitted to post-mortem scrutiny was 944, and 809
female cadavers were similarly examined out of a
total of 840 deaths.

It will thus be seen that the percentage of
post-mortem examinations has been sufficiently high
to exclude the fallacies due to cancer not having
made itself evident during life.

A calculation based upon the figures of the
Registrar's General's Returns has revealed the fact
that cancer caused a certain average number of
deaths among a given number of persons.   (52nd
Annual Report of the Registrar General, 1889, page
14)

The death rate from cancer is insignificant
until the age of 35 is reached and rapidly increases
at each higher age period.   On the basis of the
national figures, one out of 21 men, and one out of
12 women who reach the age of 35, die eventually
of cancer.

Few patients in these asylums are under the age
of 35.   The average age for the different years are
given on the table opposite.   The apparent relative
infrequency of cancer among them is therefore not
due to the fact that the patients have not reached
the age at which cancer is likely to attack them.
If the crude figures be interpreted as a ratio, it
will be seen that among the total deaths one case
of cancer occurred in 53.25 deaths of males, and

Cane Hill Asylum.

Year	Total Admissions		Average Age	
	Male.	Female.	Male	Female.
1896	218	184	41.99	41.90
1897	305	335	41.88	42.00
1898	272	225	42.11	39.36
1899	290	323	42.21	44.18
1900	264	176	40.60	41.30
1901	186	188	41.86	40.36
1902	181	142	42.69	41.09
Total	1716	1573	41.87	41.70

Year	Total Remaining		Average Age.	
	Male	Female	Male	Female
1896	904	1211	43.29	46.66
1897	945	1261	43.77	46.61
1898	948	1270	44.11	44.82
1899	942	1260	44.30	47.18
1900	952	1273	44.34	47.59
1901	934	1236	45.72	48.83
1902	922	1204	45.89	49.25
Total	6547	8715	44.49	47.26

one case of cancer occurred in 25.45 deaths of
females.   Such a crude way of stating the facts
indicates apparently a surprising infrequency of
cancer in those dying in lunatic asylums, and at
first sight seems to give support to the opinion
already referred to that cancer is very rare among
lunatics.   It will subsequently, however, be made
evident that this method of stating the incidence
of cancer is erroneous, although it really gives the
 picture of the occurrence of cancer as it is act-
ually seen by medical men engaged in work inside
lunatic asylums as compared with that occurring in
hospitals for the same, and in all probability also
among the general population.

For the proper appreciation of the figures it
is essential that the age and sex constitution of
the asylum populations among which the deaths under
review have occurred, should be taken into consid-
eration and the corrections commonly recognised as
necessary for statistical purposes made.

In the first place, it is essential to have a
basis on which to estimate the population among
which the deaths have occurred.   The population of
a lunatic asylum is of necessity a very shifting one
subject to fluctuation at different times.   The
 relative duration of the stay of different pat-
ients varies within wide limits.   The fluctuations
in the figures are given on Table opposite and a moments
reflection shows that the only figures which can be used

Chartham & Cane Hill Asylum.

Year	Total Admissions		Average Age	
	Male	Female	Male	Female
1896	298	271	41.78	42.82
1897	390	459	41.49	42.95
1898	439	437	42.68	42.68
1899	411	481	40.29	43.19
1900	372	306	40.22	42.23
1901	401	486	43.70	44.19
1902	296	261	42.07	42.59
Total	2607	2701	41.76	42.99

Year	Total Remaining.		Average Age	
	Male	Female	Male	Female
1896	1326	1689	43.82	46.86
1897	1366	1784	43.69	47.63
1898	1440	1903	44.86	46.61
1899	1453	1909	45.26	48.29
1900	1461	1892	44.95	47.66
1901	1442	1751	44.34	48.00
1902	1402	1733	45.17	49.42
Total	9890	12661	44.60	47.77

for the present purpose of this preliminary inves-
tigation are those giving the total number of pat-
ients remaining in the asylums on the 31st December
of each of the years utilised.

The total number of male patients is 9,890 and
of females 12,661, giving a total of 22,551 persons,
among whom there has been a total of 1905 deaths
including 53 cases of cancer.

In order to arrive at any true estimation of
what these figures mean, it is necessary to apply
corrections for age and sex.   In the last report of
the Registrar General (64th Annual Report of the
Registrar General, page 62) there is found the fol-
lowing table in which the death rates in 1901 per
million living in the urban and in the rural coun-
ties at ages above 35 years are compared with the
rates at corresponding ages in England and Wales as
a whole.   The mortality from cancer under 35 years
of age is relatively so small that it has been ex-
cluded from this table.

	Ages over 35 years		35 -	45 -	55 -	65 -	75 -
	Crude Rates	Corrected Rates					
Males { England + Wales	2,121	2,121	415	1,457	3,683	6,173	6,875
Urban Counties	2,062	2,218	456	1,577	3,891	6,387	6,529
Rural Counties	2,358	2,006	399	1,295	3,530	5,710	7,154
Females { England + Wales	2,903	2,903	875	2,460	4,380	6,503	7,428
Urban Counties	2,866	2,993	933	2,648	4,632	6,327	7,186
Rural Counties	3,004	2,681	826	1,994	3,941	6,796	6,934

In the first column of the foregoing table are given the crude deathrates from cancer in that portion of the population which is above 35 years of age, and in the second column, the rates corrected for differences in the age constitution of the respective populations.   Comparison of these figures emphasises the need for this modification in the eae case of diseases specially affecting particular ages.

In order to make the figures obtained from the asylums approximately comparable with those given in the above table by the Registrar General, I have estimated the deaths from cancer in terms of what the relative incidence would be per million of inmates above the age of 35 years.   For males, the death rate per million living works out at 2022, and for females at 2604.   It will be observed that these figures approximate very nearly to those given by the Registrar General for the general population under the headings "crude rates" and "corrected rates".

In view of the nature of the data upon which I am at the present moment obliged to rely, I draw what is a eem provisional conclusion, namely t that the infrequency with which cancer is met with among the inmates of lunatic asylums is only an apparent infrequency.   It is due to a variety of causes, among which the present investigation has shown that the age constitution of asylum populations plays a not unimportant rôle.

In Table ⅲ p.6 the average ages of those ad-
mitted to the asylums is given, and also the aver-
age age of those remaining at the end of each year.
From these tables it will be noted that both in
the case of the male and female populations, the
age of admission is uniformly lower than that of the
ages of those remaining.   The difference is more
especially marked in the case of females.   This
is not the place to digress into discussion of the
causes which lead to persons being admitted in the
lunatic asylums at different ages.   From the
standpoint, however, of our present investigation,
it is necessary to point out that although very few
of the patients admitted to these particular asylums
are under the age of 30, a very large proportion of
them are under 50, and that the average age of the
populations is is 44·82 for males and 48·91 for females. These averages ages have been markedly raised by a relatively
smaller number of inmates of advanced years.   The
population of the asylums under consideration is
therefore relatively a young middle aged rather than a late middle aged population in which without accurate
tabulation of the ages of all the inmates, it is
impossible to come to any definite conclusion as to
the importance to be attached to the incidence of
carcinoma among them.   It must, however, be em-
phatically pointed out that cancer is notoriously
a disease of later adult life.   It does not attain
alarming proportions until after the 35th year of
life and with advanced years the mortality increases
very rapidly, until at ages above 75, men die of

malignant disease at the rate of 6455 per million, then living, and women at the rate of 6908 per million. For the other age periods the figures have already been given above in the table quoted from the return of the Registrar General.

I draw particular attention to these figures for the reason that the error which of necessity occurs in the figures which I give, is one which favours a lower incidence of cancer per million living above 35 than in all probability more accurate and detailed data will yield. My investigation in its present stage is therefore one in which the error occurring is favourable to the view that cancer among lunatics is relatively infrequent.

I venture, however, tom to believe that the investigation in so far as it has progressed, demonstrates the untenability of the view that lunatics are relatively insusceptible to cancer. On the contrary, I conclude that there their apparent insusceptibility is due to the peculiar age and sex constitution of the population of lunatic asylums, and that with the proper application of the corrections for age and sex distribution, the discrepancy which has been recognised as obtaining between the mortality from cancer of the general population and of the population of lunatic asylums, will disappear.

I desire to thank Dr. Bashford for drawing my attention to the necessity for an investigation into the true nature of the incidence of cancer among lunat;

Vi **Malignant new growths** — Cane Hill Asylum.

Male

Organ	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80	81-85	86—	Total
Tongue						1							1
Oesophagus							1	1					2
Stomach					1	1	1		1				1
Caecum				1									
Rectum						1		2					3
Liver					1	1	1	1					1
Lung						1							4
Brain													
Total	2			1	1	3	2	4	1				14

Average Age = 58.0

Female

Organ	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80	81-85	86—	Total
Uterus			1	1		2	1	1	1		1		1
Oesophagus													1
Stomach						1	1				1		5
Small intestine													1
Hep. Flex.													1
Rectum													2
Liver		1		1	1				1	1			2
Pancreas													2
Bladder													1
Breast													2
Brain													4
Total	1	2	1	3	1	6	2	1	2	1	3		21

Average Age m+f=59.8

Average Age = 61.05

XVI

Malignant new growths — Chatham Asylum.

Male

Organ	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80	81-85	86-	Total
Tongue					1	1							2
Pharynx							1						1
Oesophagus								1					1
Pancreas									1				1
Bladder											1		1
Total					1	1	1	1	1		1		6

Average Age = 63.83

Female

Organ	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-80	81-85	86-	Total
Stomach						1	1		1				3
Sigmoid					1								1
Rectum					1	1							1
Pancreas					1	1							2
Breast							1						1
Uterus								1			1		2
Brain												1	1
Meinberg													1
Total					1	3	1	2	1		1	1	12

Average Age = 64.25

Average Age M + F = 64.11

Chartham Asylum

Year	Total Deaths		Average Age	
	Male	Female	Male	Female
1896	39	32	49.05	39.68
1897	44	31	56.31	58.95
1898	55	43	47.80	57.90
1899	39	59	54.00	57.90
1900	67	90	53.40	56.80
1901	64	51	54.30	54.40
1902	67	56	49.20	58.59
Total	375	362	51.88	55.72

Year	Total P.M's.		Average Age.	
	Male	Female	Male	Female.
1896	36	41	51.64	57.82
1897	40	30	56.92	52.66
1898	50	39	46.27	58.76
1899	36	56	54.22	58.05
1900	61	86	51.24	55.44
1901	61	46	46.90	52.17
1902	67	54	49.41	56.68
Total	351	352	49.91	56.02

Cane Hill Asylum.

Year	Total Deaths		Average Age	
	Male	Female	Male	Female
1896	96	62	49·58	55·62
1897	103	73	46·45	53·93
1898	93	66	48·90	50·54
1899	86	91	46·45	63·62
1900	130	60	54·00	49·30
1901	84	66	47·36	55·13
1902.	98	60	50·04	55·54
Total	690	478	49·26	55·31

Year	Total P. M's.		Average	
	Male	Female	Male	Female.
1896	80	54	49·70	56·24
1897	91	67	45·96	52·86
1898	69	56	50·40	51·78
1899	81	79	47·60	56·83
1900	111	52	49·99	51·09
1901	73	61	47·27	52·96
1902	88	88	49·69	49·69
Total	593	457	49·01	53·01